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REPORT OF AN OUTBREAK OF DRACUNCULIASIS  
IN ETHIOPIA

David R. Ten Eyck

Naval Medical Research Unit Number 3  
APO New York 09319

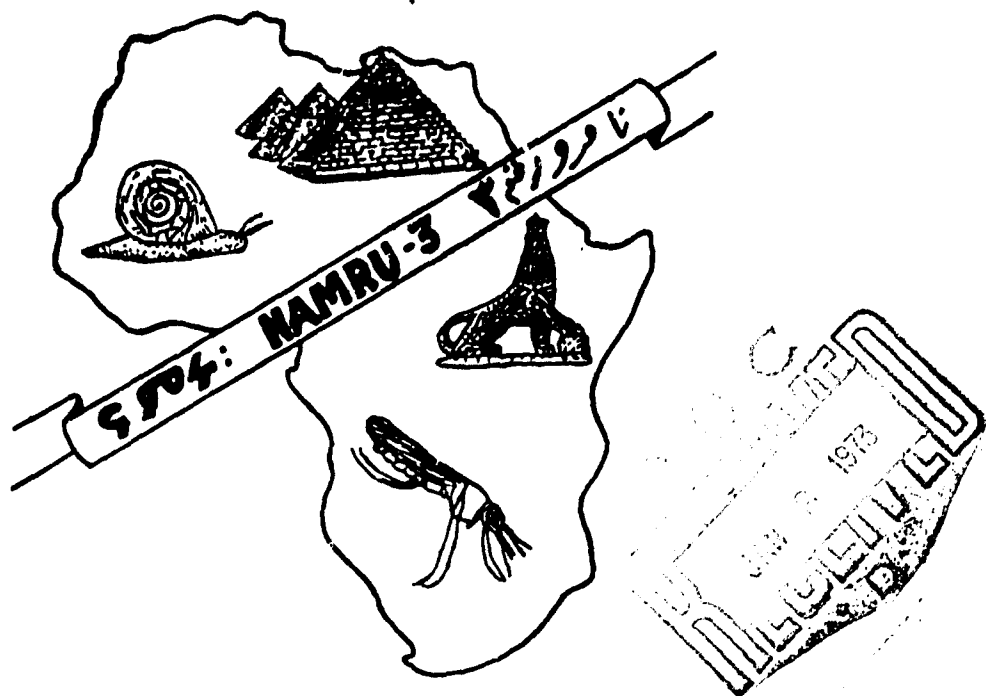
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# TECHNICAL / SCIENTIFIC REPORT

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By

David R. Ten Eyck

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13. ABSTRACT

An outbreak of dracunculiasis occurred in north-west Eritrea in mid 1968, resulting in 50 documented and 40 suspected human cases. Although the infective agent could not be traced to the suspected well in Kera, perhaps because the water was treated before being examined, strong circumstantial epidemiologic evidence clearly pointed to this well as the sole common infective source. Further, the manner in which water was taken from this well permitted that kind of contamination required to complete the life-cycle of *D. medinensis*; larvae could reach water infested with *Cyclops* spp. This was not true of the water sources in Agordat. Thiabendazole may well be a useful drug in the treatment of guinea worm infections in man, but its efficacy was not demonstrated in this study.

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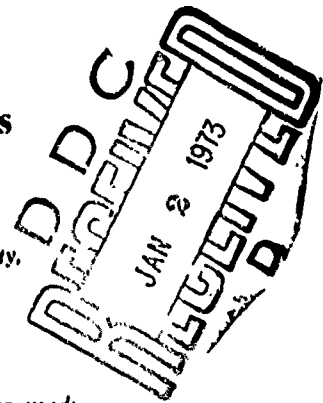
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## REPORT OF AN OUTBREAK OF DRACUNCULIASIS IN ETHIOPIA\*

David R. Ten Eyck, M.D., M.P.H.\*\*

U.S. Naval Medical Research Unit No. 3 (NAMRU-3), Field Facility,  
Addis Ababa, Ethiopia



### INTRODUCTION

Although infections in man caused by the nematode *Dracunculus medienensis* (guinea worm) are common in western and central equatorial Africa, little is known about the incidence of this parasitic disease in Ethiopia. The nearest known endemic areas are in the south-east Sudan and the Nile Valley and along the Arabian coast of the Red Sea (Faust and Russell, 1964). Rarely, victims of this disease are encountered by medical personnel in the western lowlands of Ethiopia. In 1969, one adult male was seen at NAMRU-3's Field Station in Gambela presenting with a guinea worm emerging from the mid-portion of the left leg (Schinski, 1969), and in the same year Hutchinson (1971) treated a woman similarly infected at the Gila River Mission Station, 100 km. south of Gambela. Although both patients were residents of Ethiopia, the possibility that these infections were acquired in the Sudan or elsewhere could not be excluded. Old-time residents in the district of Agordat, north-east Eritrea, claim that dracunculiasis was present in that area forty years ago and that a newly constructed permanent well in the small village of Keru was the infective source. It was in this latter area and most probably from this well, still very much in use, that guinea worm made a brief but explosive re-appearance in early 1969.

The Ministry of Public Health first became aware of the epidemic when victims began to appear for treatment at the Itegue Menen Hospital in Asmara and at the Haile Sellassie I Provincial Hospital in Agordat in late May and early June of 1969. Preliminary epidemiologic evidence, based on travel histories and an incubation period known to be from 8 to 13 months, implicated the fresh-water well in Keru as the most likely common infective source.

The village of Keru lies about 100 km. west of Agordat, across flat, roadless savanna, and has an estimated population of 2,000 persons. At least 3,000 additional people, mostly nomads, use the well in Keru as their predominant if not sole source of water. Animal herders and other traders

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\*\* Present address: U.S. Naval Medical Research Unit No. 1, Bldg. 844, Naval Supply Center, Oakland, Calif. 94625

are also known to utilize the Keru well on their way to and from the market places across the Sudan border, some 40 to 50 km. to the west. When it became clear that the well was responsible for dracunculiasis transmission, local health workers treated the water with chlorinated lime to destroy the crustacean (*Cyclops*) intermediate host. In early September, the well was re-treated empirically with "chlorine." One week later, a medical epidemiology team, comprised of the Assistant District Health Officer, the Agordat sanitation inspector and two members of NAMRU-J, arrived in Keru to conduct an investigation of the outbreak, as requested by the Ministry of Public Health and the Governor-General of Eritrea.

#### FINDINGS

**Keru:** The well in question was of cement and stone construction with elevated curbs extending two to three feet above ground level. The drawing mechanism was inoperable, and boards had been placed across the circular curb to allow the person drawing water to stand over the mouth of the well. At the time of the team's visit, a young man was seen drawing water with rope and bucket in such a way that water from the full bucket splashed down his legs and feet and back into the well. Examination of several samples of water from this well failed to reveal any evidence of *Cyclops*. Water samples from a second well, about 300 m. from the first, did contain many minute crustaceans which were identified as belonging to the *Cyclops* genus. None of the *Cyclops* examined contained larvae of *D. medinensis*. This water, however, because of its brackish taste, was considered non-potable by the villagers, and the well was covered by a concrete lid.

Twenty-two male and fifteen female residents of Keru who had suffered guinea worm infections were examined. Most of the worms had already been extracted by the local dresser, and most lesions were in the advanced stages of healing. Only one person, a middle-aged woman, was still incapacitated. She was confined to bed because of perineal inflammation secondary to incomplete worm extraction. No new guinea worm cases had appeared in the village in the month prior to the investigation. Only four persons in the surrounding nomad population came to the dresser for treatment, and the local police lieutenant estimated the total number of nomads infected with the worms to be no more than 40.

**Agordat:** The municipal water supply for the town of Agordat comes from a closed well system on the Baraka River, which the team visited. From these wells, water is pumped and stored in a closed subterranean reservoir in a nearby hill above the town, and then piped throughout Agordat from this storage area for consumption.

Twenty men were treated at the Haile Selassie I Provincial Hospital during the months of June, July, and August of 1969 for dracunculiasis. All were residents of Agordat, but had visited Keru and had drunk from the suspected well the previous year. The investigating team was able to examine twelve of these men, and found three to have evidence of active worm infection, and three to be partially incapacitated from residual inflammation and swelling around dead and incompletely extracted worms.

All lesions were on the lower extremities, although one man gave a history of upper extremity involvement which had cleared following successful extraction of a worm.

The outbreak was limited in time to a single season. Investigations conducted by Ethiopian public health officials, in March of 1971, indicated that the disease had not been seen in Eritrea since 1969.

#### TREATMENT

Thiabendazole, a broad-spectrum antihelminthic, has been used with apparent success in the treatment of dracunculiasis in western Africa (Raffier, 1967). This drug was administered to six men in Agordat having active symptoms, each receiving a total of 3 grammes orally over a six hour period. Side effects were minimal and consisted of nausea and dizziness. Follow-up reports from the Haile Selassie I Provincial Hospital some weeks later revealed, however, that no particular effect on the course of illness in the six could be ascribed to the use of thiabendazole, at least with a dosage schedule similar to that used by Raffier (1967).

#### SUMMARY

An outbreak of dracunculiasis occurred in north-west Eritrea in mid-1969, resulting in 58 documented and 40 suspected human cases. Although the infective agent could not be traced to the suspected well in Keru, perhaps because the water was treated before being examined, strong circumstantial epidemiologic evidence clearly pointed to this well as the sole common infective source. Further, the manner in which water was taken from this well permitted that kind of contamination required to complete the life-cycle of *D. medinensis*, larvae could reach water infested with *Cyclops* spp. This was not true of the water sources in Agordat. Thiabendazole may well be a useful drug in the treatment of guinea worm infections in man, but its efficacy was not demonstrated in this study.

#### RESUME

Une éruption de dracunculose est apparue vers le milieu de 1969 dans le Nord-est de l'Erythrée, avec 58 cas confirmés et 40 cas suspects. Un puits d'eau douce dans le village de Keru était mis en cause comme étant la seule source d'infestation, quoiqu'il était impossible d'y démontrer des *Cyclops* infestés, après examination par une équipe d'investigation de NAMRU-3 et du Ministère de la Santé Publique. Thiabendazole étant donné à six hommes avec des symptômes, sans résultat notable, peut-être à cause du bas dosage utilisé. Depuis 1969 il n'y a plus eu de nouveaux cas rapportés dans cette région.

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